2.0 PROPOSED ACTION AND ALTERNATIVES

This chapter describes the Proposed Action and alternatives for the disposition of certain flood and sediment detention structures built in the wake of the Cerro Grande Fire and listed in Section 1.2 of this EA. Section 2.1 describes the structures in more detail. Sections 2.2, 2.3, and 2.4 describe the Proposed Action, the Disassembly of All Structures Alternative, and the No Action Alternative, respectively. Note that the disposition of reinforcements to the Los Alamos Reservoir and the access road that was described in DOE/SEA-03 and mentioned in Section 1.2 on page 3 will not be considered in this document because they are no longer under the administrative control of DOE, NNSA.

Until NNSA determines that site conditions have returned to pre-fire status or the local ecosystem has recovered enough to approximate pre-fire conditions, the various subject structures will be maintained as described in Section 2.1; this may be the case for the next several years. The exact duration for the continuance of the status quo cannot be established at this time because of the unpredictability of weather patterns, revegetation rates, changes in soil structure, and the possibility of other events that would affect revegetation and flows, such as other fires in the watersheds above where the subject structures are located. In addition, there may be changes in NNSA missions, land management policies, and environmental stewardship policies that might affect when disposition of the subject structures should occur. The Proposed Action and alternatives described in this chapter are based on the continuance of LANL mission support activities and capabilities for the foreseeable future, as described in LANL's Site-Wide Environmental Impact Statement (SWEIS) (DOE 1999) and other DOE NEPA documents and planning documents. If changes in mission support activities or policies occur such that these alternatives are no longer suitable, further NEPA analysis might be required. Additionally, the Proposed Action and alternatives are based on the projection of adequate recovery of the ecosystem at LANL within the next eight years (by 2010) (DOE 2000b). Proposed activities under each alternative would occur by the end of 2010.

2.1 Description of Structures

2.1.1 Flood Retention Structure

The FRS, located 800 feet (ft) (240 meters [m]) downstream of the confluence of Two-Mile and Pajarito Canyons, rises 72 ft (21.6 m) above the natural ground surface and stretches 390 ft (117 m) across Pajarito Canyon (Figure 4). Beneath the FRS, the foundation is comprised of moderately welded to unwelded tuff bedrock (loosely fused volcanic ash). Near the crest of the FRS, the tuff is more welded (fused) and is identified by harder, cliff-forming units prominently visible on the north side of the valley (LANL 2001a).

The FRS construction material is RCC. Upstream, the semi-formed, near-vertical face of the FRS was trimmed by a backhoe to a roughened finish. Figure 5 shows a close-up of the surface. The unformed downstream face slopes one foot horizontally for every foot of vertical rise. The crest width is 10 ft (3.3 m). Figure 6 is a composite cross-section of the FRS. A 1-ft- (0.3-m-) wide, 10-ft- (3.3-m-) high parapet wall rises above the FRS crest, except at the 200-ft- (60-m-) long overflow spillway section in the middle (Figure 7), and ties into welded tuff at both abutments (LANL 2001a).

Figure 4. Upstream face of the FRS from upstream, north bank.

Figure 5. Close-up of RCC construction material. Quarter is placed to show scale.

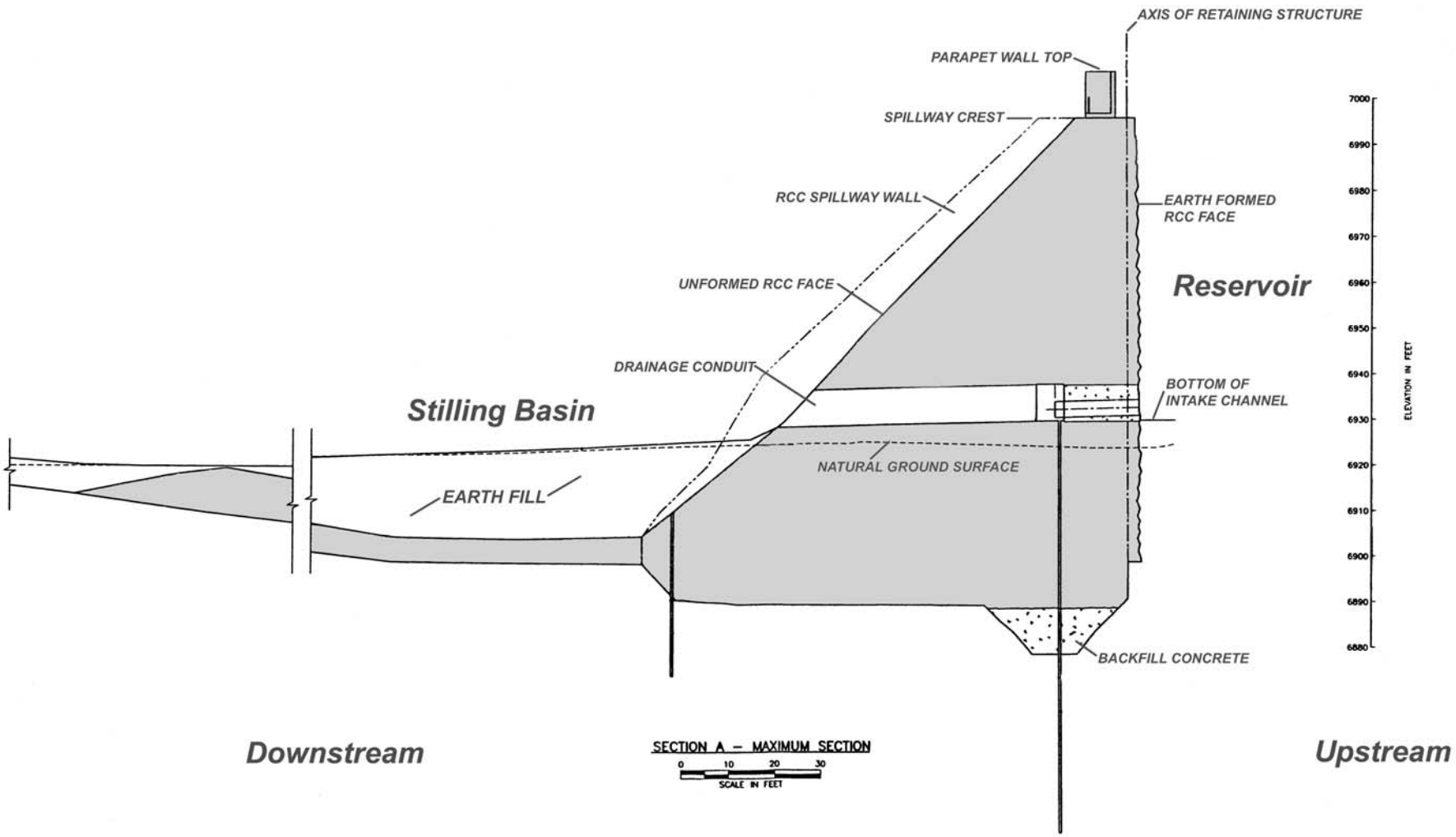

Figure 6. Composite cross section of the FRS.

Figure 7. FRS from top of canyon to show 200-ft-wide (60 m) spillway.

During construction the streambed at the retention structure site was excavated to a depth of 50 ft (15 m) below the natural ground surface and backfilled with poured concrete and RCC up to the natural ground surface (streambed) to form the underground base of the FRS. Beyond the spillway RCC was placed in a 5-ft- (1.5-m-) thick slab that overlies unwelded volcanic tuff to form the floor to the stilling basin downstream from the FRS. The floor slopes upward from the basin floor downstream to the original streambed. The stilling basin is 90 ft (27 m) wide and 60 ft (18 m) long at the foot of the FRS, 55 ft (16.5 m) wide at the streambed transition, and has an overall length of 160 ft (48 m). The stilling basin has been filled in with soil.

The FRS is designed to retain the runoff and sediment volume from precipitation events up to the 100-year, 6-hour storm, also referred to as the design basis event. Runoff from the 100-year storm would be retained in the upstream reservoir and slowly released within a 96-hour period to assist in minimizing flooding downstream.

The bottom of the FRS is equipped with a 42-inch (in.) (105-centimeter [cm]) diameter drainage conduit, placed in the direction of the stream channel, which will allow accumulated storm water to exit. This conduit is connected to a 73-ft (21.9-m) intake tower with 15-in.- (37.5-cm-) thick structural concrete walls located at the center of the FRS on the upstream side (Figure 8) to form the total outlet works. The tower contains 2-ft by 2-ft (0.6-m by 0.6-m) openings spaced at 8-ft (2.4-m) centers on two sides of the tower (Figure 9). Galvanized metal trash rack grids cover the openings (Figure 10). During a flood event, if sediment clogs lower windows, water can enter the inlet tower through the upper windows and flow out the drainage conduit down the existing

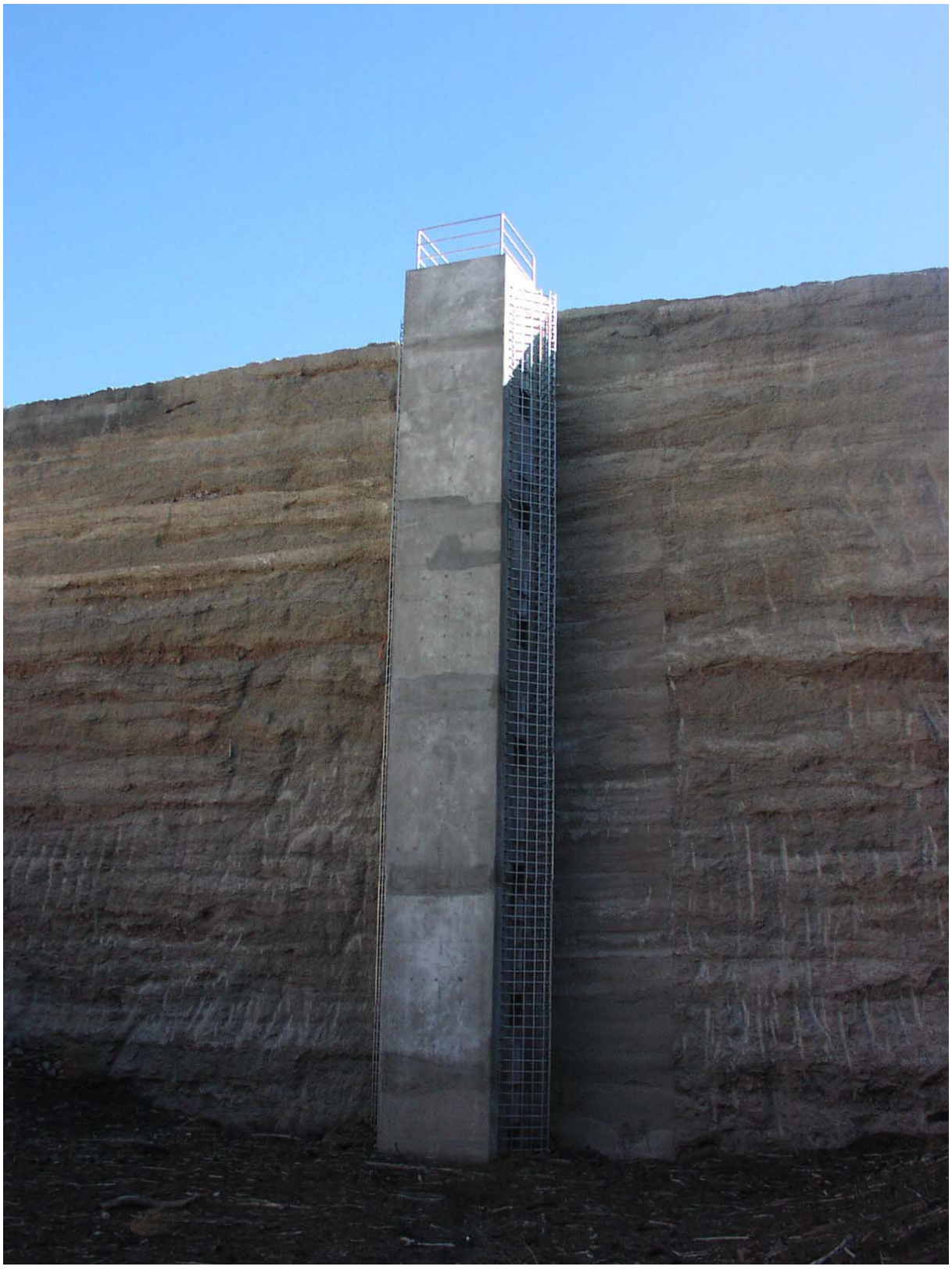

Figure 8. Close-up of the 73-ft (21.0-m) intake tower taken from reservoir on upstream side of FRS.

Figure 9. Inlet tower taken from north bank of reservoir to show spacing of openings.

Figure 10. Close-up of inlet tower to show galvanized trash rack.

streambed. As sediment in the bottom of the reservoir accumulates, the lower openings can be closed permanently by attaching steel plates. This would prevent any future "cave-ins" of silt into the drainage tower. For storm water runoff flows at rates greater than the design basis event, the structure will release water through both the outlet and over the 200-ft (60-m) spillway located along the crest of the FRS (see Figure 7).

Currently, a maintenance project is underway to correct erosion that is occurring at the outlet from the FRS. The area directly below the outlet and downstream for approximately 210 ft (63 m) will be excavated to allow for installation of gabions. Gabion work will also be completed in the areas of the structure where it joins the canyon walls in order to preclude further erosion.

The functional design life of the FRS is a minimum of 20 years. The FRS is currently under the administrative control of the USACE, which constructed the FRS on behalf of the NNSA. Transfer of the FRS from the USACE to DOE is expected to occur subsequent to core drilling work being done for the USACE to provide quality assurance data. Upon turnover from the administrative control of the USACE and acceptance of the structure, the NNSA would administer the FRS, and UC staff at LANL would be responsible for the proper operation and maintenance. The USACE Albuquerque District would inspect the FRS initially; thereafter, it would be the responsibility of UC staff at LANL to perform periodic inspections and maintenance in accordance with the LANL site-specific procedures. The annual periodic inspections for the FRS would be to determine the condition and to ascertain the adequacy of the operation and maintenance. In addition to the annual inspection, special periodic inspections are to be made to evaluate the structural safety, stability, and operational adequacy of the FRS.

UC will adapt the USACE Operation and Maintenance program (USACE 2000) into LANL site-specific procedures including routine maintenance activities and activities required by the DOE/SEA-03 MAP (DOE 2000b). The LANL site-specific procedure for the FRS includes the Operations and Maintenance Plan (LANL 2001a) and the Emergency Action Plan (EAP) (LANL 2001b), which is discussed further in this section.

During floods or periods of water retention, an inspection is required to ensure that the FRS is performing as designed. Maintenance is required to ensure that the serviceability of the FRS remains intact; this would include removing flood debris and repairing any damage caused by erosion or other forces within the reservoir on the upstream side and within the stilling basin on the downstream side. The reservoir behind the FRS and the intake structure of the outlet works are also to be cleared of logs, trees, trash, litter, and debris. The existing access road to the base of the FRS from Pajarito Road would also be maintained.

UC personnel have prepared the LANL EAP for the Pajarito Canyon Flood Retention Structure (LANL 2001b). The condition requiring the implementation of the EAP is the potential for flooding in the Pajarito watershed vicinity, as advised by the National Weather Service. Using the Federal Emergency Management Association guidelines, the EAP focuses on establishing a procedural system to complement and outline the use of physical flood control and emergency systems already in place. Although the possibility of failure of the FRS is minute, developing and maintaining the EAP is essential to safeguarding lives and minimizing physical damage in an emergency event.

As part of the MAP measures discussed in Chapter 1 of this EA, UC staff at LANL are monitoring vegetation re-growth and modeling runoff above LANL annually. This is to

determine when onsite storm water flows return to pre-fire levels or the ecosystem has at least reached a stable state approximating that condition.

At the time of FRS construction, a 3-ac (1.2-ha) staging area was created at the top of the mesa near Pajarito Road. An existing unimproved road along the south side of Pajarito Road was graded and widened to accommodate construction trucks and vehicles. A new access road was constructed from this existing road between the mesa top and the upstream side of the FRS in the canyon bottom. The road is approximately one-quarter (or 0.25) mile (mi) (0.4 kilometers [km]) in length with a maximum 28 percent grade. Four-wheel drive capability passenger vehicles are required to safely traverse the road. An existing road along the bottom of Pajarito Canyon connecting to TA-18 was also regraded and improved for use when the FRS was constructed.

2.1.2 Low-head Weir and Detention Basin

The low-head weir and detention basin (Figure 11) are located in Los Alamos Canyon near the intersection of SR 4 and SR 501 within TA-72. It was constructed to provide sediment control and detention and to decelerate storm water flow. The weir includes a large, relatively shallow depression that serves as a detention basin. The detention basin is about 500 ft (150 m) long by 100 ft (30 m) wide and is about 10 ft (3 m) deep at its deepest point. The weir is located on the downstream side of the detention basin and is about 10 ft (3 m) above ground level. It is constructed of gabions, which are rectangular wire baskets filled with large cobblestones. Approximately 11,900 cubic yards (yd^3) (9,044 cubic meters [m^3]) of soil and rock were excavated during construction and stockpiled along the sides of the canyon. The total area affected, including the weir, detention basin, and excavated backfill area, is less than 3 ac (1.2 ha).

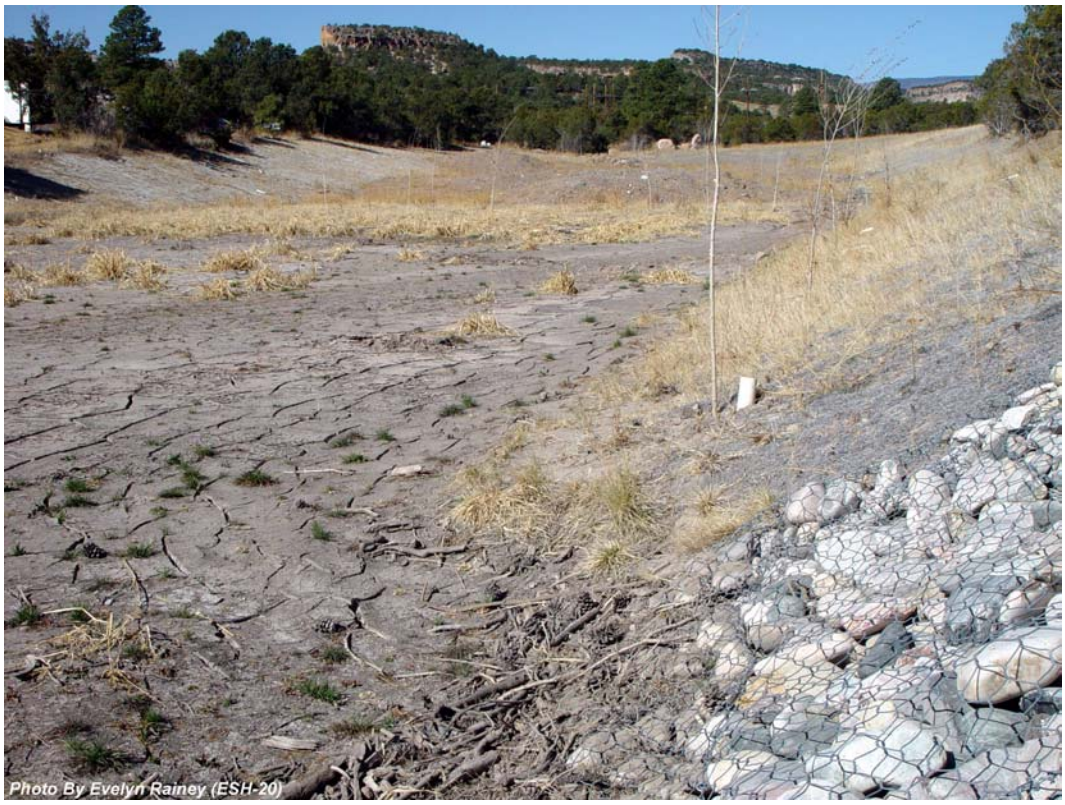

Figure 11. Los Alamos Canyon weir showing detention basin on the left and gabions on the right.

An area of about one-quarter acre in size is potentially evolving into a wetland area within the detention basin. As part of recovery efforts after the fire, typical wetland species such as willows (*Salix* spp.) were planted here. It is unknown if these can be sustained under diminishing soil saturation conditions over time. Maintenance of the weir and detention basin consists of routine inspections, possible sediment removal, and repair when required. Repair or replacement of damaged gabions is performed when necessary to maintain structural integrity of the weir. As part of the MAP implementation, sediments in the detention basin are sampled to monitor the level of contaminants washed down the canyon from upstream sources within LANL. Removal of these sediments would be performed as required based on contaminant buildup levels and the resulting wastes would be disposed of as appropriate at LANL or offsite.

2.1.3 Road Reinforcements

A test pit was excavated west (upstream) of the existing inlet for the Anchor Ranch Road land bridge across Two-Mile Canyon to characterize the road foundation material. The embankment at this canyon crossing and the embankments where SR 501 crosses Two-Mile Canyon, Pajarito Canyon, and Water Canyon were then reinforced with concrete to protect the roadbeds from becoming saturated and failing. Existing slope reinforcements and matting were removed as necessary, along with trees on or near highway embankment slopes. The slopes were then cleared, tree roots and rocks were removed, and the area was regraded. Trenches, as necessary, were excavated at all embankments. Embankments were reinforced with soil nails (shafts drilled into the embankment and pressure grouted), articulated concrete mattresses (ACMs) (concrete and steel flexible barriers or blankets that are used to stabilize soils or steep slopes that are prone to erosion), and shotcrete (a concrete mix blown onto surfaces). A spillway coated with shotcrete (Figure 12) was incorporated into the design and construction of the Anchor Ranch

Figure 12. Road reinforcements along SR 501.

Road land bridge site at Pajarito Canyon. Outlet structures were also incorporated into the design and construction of all four canyon-crossing road locations so that water would not be retained behind the roadbeds for more than four days (96 hours) after a storm event. Maintenance of the road reinforcements consists of routine inspections and repair when required. Repair or replacement of damaged sections is done when necessary to maintain structural integrity of the reinforcements.

2.1.4 Steel Diversion Wall

A 760-ft-long (228-m-long) steel diversion wall was constructed upstream of TA-18 facilities within Pajarito Canyon (Figures 13 and 14). The wall was installed quickly as an interim measure to protect TA-18 capabilities until the FRS could be built. The purpose of the wall was to divert storm water and debris to the south of Critical Assembly Storage Area I (CASA I) at TA-18. Steel panels attached to large metal beams were installed to form the wall.

The beams were driven vertically into the ground with a vibratory hammer to a depth of 30 ft to 40 ft (9 m to 12 m). The sheets extended approximately 5 ft to 6 ft (1.5 m to 1.8 m) above ground. The structure was backfilled with earth to provide additional strength on the downstream side. The functional design life of this structure is a minimum of 25 years. Routine maintenance, such as repair or replacement of the metal sheets or removal of the vegetation, will be performed over the lifetime of the wall.

Figure 13. Steel diversion wall at TA-18 under construction.

Figure 14. Detail of joined steel panel in steel diversion wall.

2.2 Proposed Action

The Proposed Action is to remove part of the above ground portion of the FRS and the entire above ground portions of the steel diversion wall; the other subject structures would remain in place with continued performance of routine maintenance activities. All of the various subject structures are located within floodplains; removal activities at the two identified structure sites would require the placement of best management practices (BMPs), such as straw bales, silt fences, and similar storm water flow controls, in accordance with a Storm Water Pollution Prevention (SWPP) Plan, which is required by the LANL National Pollutant Discharge Elimination System (NPDES) permit. The BMPs would be placed at the FRS and the steel diversion wall before demolition activities begin. LANL personnel would ensure that the New Mexico and National Air Quality Standards for particulate emissions are met throughout any demolition activities through the use, in part, of standard dust suppression methods such as water sprays or soil tackifiers[3].

To prevent serious injuries, all site construction contractors are required to submit and adhere to a Construction Safety and Health Plan. This Plan is reviewed and approved by UC staff before construction activities can begin. Following approval of this Plan, UC and NNSA site inspectors would routinely verify that construction contractors are adhering to the Plan, including applicable Federal and state health and safety standards.

[3] Tackifiers are chemical dust suppressants often added to water that acts to disperse the chemicals, then evaporates after application. The chemicals that are left behind bind the soil particles together into larger particles that are less easily blown into the air.

2.2.1 Flood Retention Structure

Implementing the Proposed Action would result in the removal of part of the FRS above ground level and in the removal of sediments sufficient to allow resumption of the natural flow in the streambed without future floodwater retention. Currently, the volume of sediment that has accumulated behind the FRS is estimated to be about 9,680 yd^3 (7,357 m^3) of material at a depth of 6 ft (1.8 m) at the base of the FRS. This volume of sediment represents two years accumulation. With continuing revegetation in the watershed above the FRS, sediment is likely to be deposited and accumulate at a diminishing rate. As part of the DOE/SEA-03 MAP (DOE 2000b), the sediment is tested annually for chemical, radiological, and heavy metal constituents. Removal of sediment volumes under the Proposed Action would be based on the sediment composition as well as on the amount of accumulation over the next several years. A bounding volume of 48,400 yd^3 (36,785 m^3) of sediment material could be removed (to ground level) from the FRS site; this is the amount estimated to accumulate over 10 years based on the accumulation in the two years following the Cerro Grande Fire.

As described in Section 2.1, gabions are presently being installed along the downstream channel; some of these would also be removed as part of the Proposed Action. Design studies would be performed at that time to determine the width of the channel needed and required slope. This analysis estimates that a maximum 200-ft- (60-m-) wide breach would need to be opened in the FRS. Figure 15 shows a digitally altered picture to visualize partial removal of the FRS.

Figure 15. Digitally altered picture of the FRS to show partial removal.

The concrete structure would be broken up mechanically using equipment such as jackhammers or hydraulic splitters or with controlled explosives blasting, or by a combination of these means. Dust suppression measures would be used when appropriate to control particulate emissions. Approximately 25,000 yd^3 (19,000 m^3) of concrete debris from the FRS, approximately 48,400 yd^3 (36,785 m^3) of sediment material, and approximately 200 yd^3 (153 m^3) of gabion rock would be removed and hauled out of the canyon by 6-wheel-drive capability vehicles.

There are two different options for removal of sediment, concrete and gabion rock resulting from the demolition of the FRS, depending on the decisions made about the future disposition of the TA-18 capabilities and facilities that are currently located downstream from the FRS (see Related Actions discussion later in the text of this chapter). Option A describes the Proposed Action under the condition that the TA-18 capabilities and facilities remain located in facilities downstream from the FRS and that national security concerns would not allow use of the maintenance road below the FRS. Option B describes the Proposed Action under the condition that the TA-18 mission has been relocated and that the existing facilities are not subject to heightened national security measures, allowing construction equipment access through that site. The project conducted under either option would take about seven months to complete. There would be about 20 workers at the site during the time of highest activity.

Option A. TA-18 Capabilities are Not Relocated

If TA-18 capabilities continue at their present location, the Proposed Action project would use the existing access road that connects Pajarito Canyon to Pajarito Road. The road may have to be modified to change the current steep grade. Each truck could transport about 20 yd^3 (15.2 m^3), resulting in approximately 1,250 loads[4] of concrete debris and 10 loads of gabion rocks to be transported up the access road. An additional 2,420 loads of sediment material could also be removed. The concrete, rocks, and sediment would be hauled to the existing 3-ac (1.2-ha) staging area located along Pajarito Road at the intersection of the access road.

Alternatively, DOE may decide to use a continuous generator conveyor belt, such as those that are used in the mining industry, to haul debris out of the canyon. This would minimize truck traffic in the canyon. The aforementioned staging area at Pajarito Road would be required.

At the staging area, the concrete would be loaded onto dump trucks for transportation to a long-term storage yard within LANL. The concrete removed from the canyon could be crushed at the Pajarito Road staging area site or at the long-term storage site. The concrete rubble and gabion rock would be stored long term until used for construction projects at LANL or off site. Currently this type of material is stored at Sigma Mesa. Sediment would be removed by dump truck and properly disposed of.

At the end of demolition and removal of the gabions, concrete, and sediment, the streambed would be graded. The remaining sides of the FRS would be stabilized and the banks would be reseeded. The area would be monitored and maintained to prevent erosion of the slopes and damage to the floodplain and downstream wetlands. The access road would be removed and that part of the canyon wall would be recontoured and stabilized.

[4] For each truckload of material removed from the site, this analysis assumes two truck trips (one full and one empty) over LANL roads.

Option B. Proposed Action if TA-18 Capabilities are Relocated

If the TA-18 capabilities and facilities are relocated away from TA-18, it is unlikely that NNSA would decide to use the existing site for any NNSA mission support activity that had the same level of national security requirements. Currently, access to the maintenance road below the FRS connecting to the TA-18 facilities is restricted because of enhanced security conditions. If this mission relocation occurs before the disposition of the FRS, the existing maintenance road below the FRS and the area occupied by the TA-18 facilities could be used for transportation and staging of the concrete, rock, and sediment. The road would be upgraded and erosion BMPs would be installed. Similar to Option A, the removal would require 6-wheel-drive off-road vehicles to carry the concrete, rocks, and sediment up the road. The truckloads and material quantities would be the same as for Option A. A new 3-ac (1.2-ha) staging area would be established and used in TA-18. The staging area would be located outside of the floodplain and would be sited so as to avoid any cultural resources and potential release sites (PRSs). At the staging area, the concrete would be loaded onto dump trucks for transportation to a long-term storage yard within LANL. The concrete removed from the canyon could be crushed at the Pajarito Road staging area site or at the long-term storage site. The concrete rubble and gabion rock would be stored long term until used for construction projects at LANL or off site. Currently this type of material is stored at Sigma Mesa. Sediment would be removed by dump truck and properly disposed of.

At the end of demolition and removal of the gabions, concrete, and sediment, the streambed would be graded. The remaining sides of the FRS would be stabilized and the banks would be reseeded. The area would be monitored and maintained to prevent erosion of the slopes and damage to the floodplain and downstream wetlands. Unlike Option A, at the end of the FRS removal activities, both the maintenance road and the access road to the upstream side of the FRS would be retained as fire roads for vehicle access to the upper portion of Pajarito Canyon and the firing sites at TA-22.

2.2.2 Low-head Weir and Detention Basin

The low-head weir and detention basin would be left in place as part of the Proposed Action; routine maintenance activities would be performed. As described previously in this EA, a wetland could be present in the detention basin, although this is uncertain. If present, the wetland would remain in place. Current maintenance activities would be carried out, including the replacement of wire mesh containers as they rust or fail. Sampling of sediments would be performed to evaluate potential chemical radiological and heavy metal constituent concentrations in the detention basin, and sediments would be removed as required and disposed of appropriately through the LANL waste management program.

2.2.3 Road Reinforcements

Road reinforcements would be left in place as part of the Proposed Action. Routine inspection and maintenance activities would continue to be conducted when required.

2.2.4 Steel Diversion Wall

Under either option for the TA-18 facilities, the steel diversion wall above TA-18's CASA I would be removed. The pilings would be removed down to ground level with a cutting torch or similar tool. The 25 yd^3 (19 m^3) of panels and beams generated by the demolition would be

removed and shipped offsite for recycling. A crew of eight would be required to work for approximately six weeks to accomplish removal of this structure.

2.3 Disassembly of All Structures Alternative

The Disassembly of All Structures (Disassembly) Alternative is to remove all of the above ground portion of the FRS, the low-head weir and detention basin, the road reinforcements, and the entire above ground portions of the steel diversion wall. All of the various subject structures are located within floodplains; removal activities would require the placement of BMPs, such as straw bales, silt fences, and similar storm water flow controls in accordance with a SWPP Plan, which is required by the LANL NPDES permit. The BMPs would be placed at the FRS and the steel diversion wall before demolition activities begin. LANL personnel would ensure that the New Mexico and National Air Quality Standards for particulate emissions are met throughout any demolition activities through the use, in part, of standard dust suppression methods such as the use of water sprays.

2.3.1 Flood Retention Structure

Implementing the Disassembly Alternative would result in the total removal of the FRS to ground level, along with sediments and gabion rocks, and restoration of the entire area of the FRS and reservoir surface to approximately preconstruction topographic conditions. This is shown in Figure 16, which is a digitally altered representation of complete removal of the FRS. Vegetation would be reseeded and small saplings may be planted as deemed appropriate.

Figure 16. Digitally altered picture of complete removal of the FRS.

As described under the Proposed Action, the maximum volume of sediment that could build up behind the FRS is 48,400 yd^3 (36,785 m^3); up to this amount of sediment material would be removed from the FRS site under this Disassembly Alternative. Approximately 300 yd^3 (230 m^3) of gabion rocks and 50,000 yd^3 (38,000 m^3) of concrete debris from the FRS would be removed.

The concrete structure would be broken up mechanically using equipment such as jackhammers or hydraulic splitters or with controlled explosives blasting, or by a combination of these means. Dust suppression measures would be used when appropriate to control particulate emissions.

There are two different options for removal of sediment and concrete resulting from the demolition of the FRS, depending on the decisions made about the future disposition of the TA-18 capabilities and facilities that are currently located downstream from the FRS (see Related Actions discussion later in the text of this chapter). Option A describes the Disassembly Alternative under the condition that the TA-18 capabilities and facilities remain located in facilities downstream from the FRS and that national security concerns would not allow use of the maintenance road below the FRS. Option B describes the Disassembly Alternative under the condition that the TA-18 mission has been relocated and that the existing facilities are not subject to heightened national security measures, allowing construction equipment access through that site. The project conducted under either option would take about 10 months to complete. There would be about 20 workers at the site during the time of highest activity.

Option A. Disassembly Alternative if TA-18 Capabilities are Not Relocated

If TA-18 capabilities continue at their present location, the Disassembly Alternative project would use the existing access road that connects Pajarito Canyon to Pajarito Road. The road may have to be modified to change the current steep grade. Each truck could transport about 20 yd^3 (15.2 m^3) of material, resulting in approximately 2,500 loads of concrete and 15 loads of gabion rocks to be transported up the access road. An additional 2,420 loads of sediment could also be removed. The concrete and rock debris and sediment would be hauled to the existing 3-ac (1.2-ha) staging area located along Pajarito Road at the intersection of the access road.

Alternatively, DOE may decide to use a continuous generator conveyor belt, such as those that are used in the mining industry, to haul material out of the canyon. This would minimize truck traffic in the canyon. The aforementioned staging area at Pajarito Road would be required.

At the staging area, the concrete would be loaded onto dump trucks for transportation to a long-term storage yard within LANL. The concrete removed from the canyon could be crushed at the Pajarito Road staging area site or at the long-term storage site. The concrete rubble and gabion rocks would be stored long term until used for construction projects at LANL or off site. Currently this type of material is stored at Sigma Mesa. Sediment would be removed by dump truck and properly disposed of.

At the end of demolition and removal of the gabions, concrete, and sediment, the streambed would be graded. The banks would be stabilized and reseeded. The area would be monitored and maintained to prevent erosion of the slopes and damage to the floodplain and downstream wetlands. The access road would be removed and that part of the canyon wall would be recontoured.

Option B. Disassembly Alternative if TA-18 Capabilities are Relocated

If the TA-18 capabilities and facilities are relocated away from TA-18, it is unlikely that NNSA would decide to use the existing site for any NNSA mission support activity that had the same level of national security requirements. Currently, access to the maintenance road below the FRS connecting to the TA-18 facilities is restricted because of enhanced security conditions. If this mission relocation occurs before the disposition of the FRS, the existing maintenance road below the FRS and the area occupied by the TA-18 facilities could be used for transportation and staging of the concrete, rock, and sediment. The road would be upgraded and erosion BMPs would be installed. Similar to Option A, the removal would require 6-wheel-drive off-road vehicles to carry the concrete debris, rocks, and sediment up the road. The truckloads and material quantities would be the same as for Option A. A new 3-ac (1.2-ha) staging area would be established and used in TA-18. The staging area would be located outside of the floodplain and would be sited so as to avoid any cultural resources and PRSs. At the staging area, the concrete would be loaded onto dump trucks for transportation to a long-term storage yard within LANL. The concrete removed from the canyon could be crushed at the Pajarito Road staging area site or at the long-term storage site. The concrete rubble and gabions would be stored long term until used for construction projects at LANL or off site. Currently this type of material is stored at Sigma Mesa. Sediment would be removed by dump truck and properly disposed of.

At the end of demolition and removal of the gabions, concrete, and sediment, the streambed would be graded. The banks would be stabilized and reseeded. The area would be monitored and maintained to prevent erosion of the slopes and damage to the floodplain and downstream wetlands. Unlike Option A, at the end of the FRS removal activities, both the maintenance road and the access road to the upstream side of the FRS would be retained as fire roads for vehicle access to the upper portion of Pajarito Canyon and the firing sites at TA-22.

2.3.2 Low-head Weir and Detention Basin

The low-head weir and detention basin would be removed as part of this alternative. As described previously in this EA, a wetland could be present in the detention basin, although this is uncertain. A bounding volume of 17,000 yd^3 (12,900 m^3) of sediment (850 truckloads) could be removed from the site; this is the amount estimated to accumulate over 10 years based on the accumulation of 3,400 yd^3 (2,600 m^3) in the two years following the Cerro Grande Fire. In addition, approximately 1,700 yd^3 (1,300 m^3) of gabion rock (85 truckloads) could be removed, as would the potential wetland if it is sustainable.

The low-head weir would be removed using hand-held tools, front-end loaders, and other heavy construction machinery. The accumulated sediment would be tested for potential elevated constituents and would be removed from the site and disposed of appropriately. Fill material would be brought in to fill the detention basin or some of the approximately 11,900 yd^3 (9,044 m^3) of excavated soil, and rocks would be used from the sides of the canyon where it was stockpiled during construction activities. A crew of five would be required to work approximately three weeks to accomplish total removal of the low-head weir and detention basin.

2.3.3 Road Reinforcements

The ACMs and shotcrete would be removed from the road under this alternative. The volume of material would be 500 yd^3 (380 m^3) or 25 truckloads. The road banks would be re-graded. Demolition debris would be removed from the site and disposed of appropriately. This would leave these roads without any reinforcements because the work performed as part of the Cerro

Grande Fire rehabilitation replaced reinforcements that already existed. A crew of 10 would be required to work for approximately six weeks to accomplish removal of the reinforcements.

2.3.4 Steel Diversion Wall

Under this alternative, the steel diversion wall above TA-18's CASA I would be removed to ground level. This action is described in Section 2.2.4.

2.4 No Action Alternative

2.4.1 Flood Retention Structure

Under the No Action Alternative, the FRS would remain intact. UC staff at LANL would continue inspection and maintenance activities. However, because the ecosystem would have returned to pre-fire or to near pre-fire conditions and the danger of major flooding would be reduced, it is unlikely that water would be retained in the reservoir behind the FRS. This would reduce the requirement for debris removal at the FRS over time and revegetation would gradually occur. The steep embankment would need continued maintenance for erosion control.

UC staff at LANL would continue annual inspections and the special periodic inspections to evaluate the structural safety, stability, and operational adequacy of the FRS. If structural or stability problems of the FRS are detected, DOE would make a decision on repair or disposition of the FRS at that time and additional NEPA compliance review would be needed.

2.4.2 Low-head Weir and Detention Basin

Under the No Action Alternative, the low-head weir and detention basin would be left in place. Routine inspections and maintenance would be continued as described for the Proposed Action.

2.4.3 Road Reinforcements

Under the No Action Alternative, road reinforcements would be left in place. Routine inspections and maintenance would be continued as described for the Proposed Action.

2.4.4 Steel Diversion Wall

Under the No Action Alternative, the steel diversion wall would be left in place. Routine inspections and maintenance activities would be continued.

2.5 Alternatives Considered but not Analyzed

As described in Section 2.1.1 and Figure 6, the FRS below ground level consists of RCC to a depth of 50 ft (15 m). Below the spillway is a 5-ft- (1.5-m-) thick slab that forms the floor to the stilling basin. Removal of the below ground features as part of the Proposed Action is not necessary as the restoration of the stream channel flow is possible without the removal of these structures.

2.6 Related Actions

2.6.1 Special Environmental Analysis

As described in Section 1.2, NNSA prepared a special environmental analysis (DOE/SEA-03) (DOE 2000a) that documents its assessment of impacts associated with emergency activities conducted at LANL in response to major disaster conditions caused by the Cerro Grande Fire. NNSA would normally have prepared an EIS in compliance with NEPA to analyze potentially significant beneficial or adverse impacts that could occur if a proposed action was implemented. However, because of the urgent nature of the actions required to address the effects of the Cerro

Grande Fire as it burned over LANL and the need for immediate post-fire recovery and protective actions, NNSA had to act immediately and was therefore unable to comply with NEPA in the usual manner. NNSA invoked the CEQ's emergencies provision of its NEPA Implementing Regulations (40 CFR Part 1506.11) and the emergency circumstances provision of DOE's NEPA Implementing Regulations (10 CFR Part 1021.343[a]). Pursuant to those provisions, NNSA consulted with CEQ about alternative arrangements for NEPA compliance for its emergency action. Consistent with agreements reached during those consultations, NNSA prepared the DOE/SEA-03 (DOE 2000a) of known and potential impacts from wildfire suppression, post-fire recovery, and flood control actions. The DOE/SEA-03 can be found in DOE Reading Rooms in Albuquerque (at the Government Information Department, Zimmerman Library, University of New Mexico), and in Los Alamos (at the Community Relations Office located at 1619 Central Avenue).

2.6.2 Relocation of TA-18 Operations

TA-18 is the current location of facilities that support research in and design, development, construction, and application of experiments on nuclear criticality. These experiments involve the use of special nuclear material and require strict national security measures. NNSA has issued a draft EIS (DOE/EIS-D0319; DOE 2001) to support a decision on the future location of these operations. The preferred alternative is to relocate the TA-18 criticality experimental facilities to a site at TA-55 in order to consolidate security measures for the TA-18 operations with those of TA-55. Three other NNSA sites for receiving these operations have also been analyzed, including Sandia National Laboratories in Albuquerque, New Mexico; Argonne West at Idaho National Engineering and Environmental Laboratory in Idaho Falls, Idaho; and the Nevada Test Site, Nevada. Upgrading the existing facilities at TA-18 was also analyzed in the EIS as well as the No Action Alternative of retaining the current facilities at TA-18. NNSA expects to issue the Final EIS in calendar year 2002.

2.6.3 Site-Wide Environmental Impact Statement

The final LANL SWEIS (DOE/EIS-0238; DOE 1999), dated January 1999, was issued in February of that year. A Record of Decision (ROD) was issued in September 1999 and a MAP was issued in October 1999. In the ROD, DOE decided to continue operating LANL at the Expanded Operations Alternative Level. The SWEIS annual yearbook includes information on LANL operations and data on emissions and waste generation.

Part of the accident analysis in the SWEIS examined the potential effects of a wildfire at LANL. A special edition of the SWEIS yearbook (LANL 2000) compared this postulated accident in the SWEIS with the actual wildfire. Future issues of the LANL SWEIS yearbook will include information and updates on the impacts of the fire and changes to the ecological setting at LANL, as well as cumulative fire effects information. This EA will tier from the broader scope SWEIS.

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